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Assessment of Pollution Risks

When considering the assessment of a pollution risk from a given site or process, management have to weigh a number of factors. These may seem quite straightforward, i.e. "what is the risk of a pollution incident occurring on a site". However, it becomes much more complicated when the format is amended to include "what are the off-site consequences of an incident". These will need to take account of geographical and other factors which may be difficult to quantify.

What is "Pollution"?

Pollution is the effect that makes any aspect of the environment harmful to human, plant or animal life. Harm may be seen in terms of damage to health or damage to property.

Legislation

The amount and complexity of environmental legislation has grown greatly in the past 10 years. Modern legislation is there to protect the environment and pollution incidents may constitute a criminal offence. Environment Canada list 14 acts they administer on their website. In addition each province has its own legislation. It is important to familiarize yourself with the legislation relevant to your location and operation.

The Solution

Both company managers and insurance/risk managers recognise that identifying the risk and reducing it to the lowest practicable level presents the best option.

Estimation and Evaluation of Environmental Risks

Environmental risk may be described as a combination of the likelihood of a pollution event occurring and the consequences of that event. If both are high, then the risk of the polluting event occurring is very high risk.

All environmental risks have three features: A source of pollution, a pathway for it to travel and a receptor. Each of these needs to be considered separately in assessing the pollution risk from a particular event. The effects of pollution can be felt at great distance from the event and can include pollutant release, damage to property, plants and animals and harm to human health. Each of these can pose problems to the assessor associated with estimating the probability and consequences of the incident.

A Five-Step Assessment Procedure

1. Identify the *hazards* posed by the site and its activities/potential incidents.
2. Identify the *consequences* of an incident.
3. Identify the *extent or magnitude* of the consequences.
4. Estimate the *probability* of the consequences identified.
5. Estimate the *risk* of pollution at the site. This will be a combination of the probability of the event and of the consequences (nature and magnitude) of the release.

Assessment

Site management systems will greatly affect the risks posed by ensuring that adequate control systems are in place. When estimating the extent and consequences of an incident, the geography and surroundings of the site must also be carefully considered. Risk advisers should consider the pollutant pathways as well as the nature and toxicity of the release. Since pollutant pathways can be long, damages may occur at great distances from the site. Estimation of liabilities may require computer modeling and should consider at the very least the impact of pathways through air, surface water, groundwater and the soil. Pollution can travel through these media very quickly and easily. Site drains also provide a quick and easy pathway for pollutants to leave the site. Factors that can have a profound effect on the damages that may be incurred include the proximity and

density of population, land use, water abstraction points, sewage works, fish farms, and boreholes. Assessment systems may have to be weighted to account for the relative importance of these various factors.

Commercial Risk Assessment Methods

There are a number of models available commercially to assist in the estimation of environmental risk. These include Hazard and Operability Studies (HAZOP), Failure Mode and Effects Analysis (FMEA), Fault Tree Analysis, Event Tree Analysis and Cause-Consequence Analysis. Research is currently being conducted into the effect of environmental management systems as an aid to insurers and managers in the area of environmental risk.

Finding out the Facts

The first part of an environmental risk Assessment requires the gathering of data-about the company, its location, its processes and management systems. Also about the surroundings, use of property etc., for some distance from the site. Also required will be a full inventory of substances used, transported and stored on the site, together with the transport of wastes and other materials off site. Those areas where the law requires particular actions to prevent pollution e.g. air cleaning equipment, effluent treatment and protection of storage facilities and pipelines by bunds and catchpits are particularly important.

Key Action Steps

- Review the activities, substances, quantities, and nature of processes onsite.
- The well-tested strategy of Elimination, Reduction, Substitution, Isolation and Control can be used as a good management tool for risk reduction.
- Ensure that all legal liabilities are met in terms of Authorizations, Licenses and Consents.
- Ensure that your insurer is fully aware of the activities carried out on your site.
- Develop and test emergency plans and review results.

Additional References

Environment Canada
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